Air Quality Permitting
Statement of Basis

March 13, 2007

Permit to Construct No. P-060450

Pacific Ethanol
Burley, ID

Facility ID No. 031-00032

Prepared by:

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AIR QUALITY DIVISION

PROPOSED

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Acronyms, Units, and Chemical Nomenclatures

acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
ASTM	American Society for Testing and Materials
BACT	Best Available Control Technology
Btu	British thermal unit
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
EPA	U.S. Environmental Protection Agency
gpm	gallons per minute
gr	grain (1 lb = 7,000 grains)
HAPs	Hazardous Air Pollutants
hp	horsepower
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometer
lb/hr	pound per hour
m	meter(s)
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NOx	nitrogen oxides
NSPS	New Source Performance Standards
O_3	ozone
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
ppm	parts per million
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Rules	Rules for the Control of Air Pollution in Idaho
scf	standard cubic feet
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SM	Synthetic Minor
SO_2	sulfur dioxide
SOx	sulfur oxides
T/yr	tons per year
$\mu g/m^3$	micrograms per cubic meter
UTM	Universal Transverse Mercator
VOC	volatile organic compound

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, Rules for the Control of Air Pollution in Idaho, for issuing permits to construct.

2. FACILITY DESCRIPTION

Pacific Ethanol, Inc. is proposing to build a new fuel-grade ethanol facility with a maximum permitted capacity of 60 MMGal/yr of undenatured ethanol. The facility will be located near Burley. The facility will process approximately 22.5 million bushels of corn per year. The facility will consist of the following operations.

Grain Handling and Milling Operations

Grain handling operations consist of unloading of corn by trucks and railcars at a maximum rate of 420 tons per hour, two 262,700-bushel capacity storage bins, two corn elevators, and associated conveyors. Annual corn unloading rate is estimated based on the maximum anhydrous ethanol production rate of 60 MMGal/yr is 629,213 tons per year. The dump pits and associated corn transfer points are controlled by the corn receiving and handling baghouses. Corn storage bins vents emissions are controlled by filters. The corn receiving area is partially enclosed and the dump pits are aspirated to a baghouse.

The corn milling operations consist of a grain surge bin, a scalper (screening bin) and three hammermills. Corn is fed by the reclaim system from the corn storage silos, which moves it from the adjacent surge bins to the scalper at a maximum rate of 79 tons per hour and 629,213 tons per year. Particulate matter emissions from the scalper and surge bins are controlled by the four surge bin spot vent filters. The three hammermill particulate matter emissions are controlled by a baghouse.

Fermentation and Distillation Operations

The fermentation and distillation operations consist of a slurry tank, yeast tank, liquefaction tank, beerwell, de-gas vessel, three-column distillation unit, molecular sieve, 200 proof condenser, whole stillage tank, process condensate tank, thin stillage tank, syrup tank, evaporators, two centrifuges, and four fermenters.

Processed grain is cooked with water and enzymes. The mash is cooled and active yeast is added. Fermentation occurs in one of four 560,200 gallon fermentors. The gases generated during fermentation (primarily carbon dioxide) are vented to the fermentation scrubber for recovery of any ethanol vapors. When fermentation is completed, the “beer” is transferred to the 729,400-gallon beerwell.

The beer, which consists of approximately 11-15% ethanol, is pumped to a beer stripper where the remaining grain solids are removed. The beer will distill in a three-column distillation processing consisting of a beer stripper, side stripper and rectifier column; the resultant product is 95% ethanol and 5% (190-proof) water and whole stillage consisting of solids and water. Ethanol vapor from distillation is drawn and superheated in the molecular sieve using steam; this process is known as dehydration. The dehydration process increases the ethanol concentration to 99.3%. The product will then be combined with 5% natural gasoline and sold as near 200-proof denatured ethanol. The denatured ethanol will be shipped via tanker truck and rail car.

All volatile organic compound (VOC) emissions from the fermentation and distillation process are controlled by one of two packed bed wet gas scrubbers and then vented to regenerative thermal oxidizer to destruct the remaining VOC.

Storage Tanks

190-proof ethanol will be stored in one 39,000 gallon tank prior to entering the molecular sieves. Denauturant used to blend with the ethanol product will be stored in one 74,300 gallon denaturant tank. Two 116,800 gallon anhydrous ethanol tanks will be used to store finished ethanol prior to blending and shipment. Denatured ethanol will be stored in two 350,000 gallon tanks. All tanks will utilize an internal floating roof for VOC emission control.

Ethanol Loadout Operations

Liquid product loading consists of submerged loading of denatured fuel ethanol into tanker trucks and tanker railcars. The emissions from the truck and railcar loadout will be controlled by the regenerative thermal oxidizer.

Boilers

Steam is required to power the process. The facility will use three natural gas fired boilers with a maximum capacity of 75.6 MMBtu/hr each.

3. FACILITY / AREA CLASSIFICATION

Pacific Ethanol is classified as a synthetic minor facility because the potential to emit is limited to less than major source thresholds. The AIRS classification is SM.

The facility is located within 63 and UTM zone 12. The facility is located in Cassia County which is designated as unclassifiable for a regulated criteria air pollutants (PM_{10}, CO, NO_x, SO_2, lead and ozone).

The AIRS information provided in Appendix A defines the classification for each regulated air pollutant at Pacific Ethanol. This required information is entered into the EPA AIRs database.

4. APPLICATION SCOPE

Pacific Ethanol has submitted an application for the initial permit to construct for a fuel grade ethanol plant. The plant will consist of grain handling and processing operations; fermentation, distillation and fuel mixing and loadout.

4.1 Application Chronology

November 3, 2006	15-day pre-permit construction approval application received by DEQ
November 20, 2006	Pre-permit construction approval granted by DEQ and application determined complete

5. PERMIT ANALYSIS

This section of the Statement of Basis describes the regulatory requirements for this PTC action.

5.1 Equipment Listing

Table 5.1 EQUIPMENT LISTING

Emission Unit	Size or Capacity	Control Equipment
Truck Dump Pit - Corn	20,000 Bushels/hr	Corn Receiving Baghouse
Rail Dump Pit - Corn	20,000 Bushels/hr	
3- Corn Conveyors	20,000 Bushels/hr	
2- Corn Elevators	20,000 Bushels/hr	
Scalper	20,000 Bushels/hr	
2- Corn Bins	262,700 Bushels	Spot Filters
Corn Surge Bin	1,200 Bushels	Surge Bin Spot Filters
3- Hammermills	1,124 Bushels/hr	Hammermill Baghouse
Liquefaction Tank	58,200 Gallons	Fermentation Scrubber & RTO
Yeast Tank	142,000 Gallons	
4- Fermentors	560,200 Gallons	
Beerwell	729,400 Gallons	
De-gas	65,000 Gallons per hour	
Slurry Tank	11,000 Gallons	Vent Gas Scrubber & RTO
Beer Stipper	26,000 Gallons	
Side Stripper	10,100 Gallons	
Rectifier Column	27,400 Gallons	
Molecular Sieve	5,708 Gallons	
200-Proof Condensor	7,050 Gallons/hr	
Whole Stillage Tank	138,200 Gallons	
Process Condensate Tank	38,000 Gallons	
Evaporator	22,500 Gallons	
2-Centrifuge	7,050 Gallons/hr	
Syrup Tank	5,700 Gallons	
Thin Stillage Tank	102,000 Gallons	
Ethanol Truck Loadout	38,000 Gallons/hr	RTO
Ethanol Rail Loadout	60,000 Gallons/hr	
3-Boilers	75.6 MMBtu/hr, Natural Gas	NONE
190-Proof Tank	39,000 Gallons	Internal Floating Roof
Denaturant Tank	74,300 Gallons	
2- 200 Proof Tanks	116,800 Gallons	
2- Denatured Ethanol Tanks	350,000 Gallons	
Cooling Towers		NONE

5.2 Emissions Inventory

Table 5.2 gives a summary of the criteria pollutant emissions estimates for the facility as permitted.

Table 5.2 CRITERIA AIR POLLUTANT EMISSIONS SUMMARY

Emission Source	PM		PM_{10}		SO_2		NO_x		VOC		CO	
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Corn Receiving Baghhouse	0.86	3.75	0.86	3.75								
Corn Handling Baghouse	0.43	1.88	0.43	1.88								
Corn Bin #1	0.034	0.15	0.034	0.15								
Corn Bin #2	0.034	0.15	0.034	0.15								
Surge Bin	0.018	0.08	0.018	0.08								
Hammermilling Baghouse	0.386	1.69	0.386	1.69								
Regenerative Thermal Oxidizer	0.046	0.2	0.046	0.2	0.004	.02	0.3	1.31	5.32	23.3	0.51	2.25
Boiler #1	0.564	2.47	0.564	2.47	0.04	0.19	3.78	16.56	0.41	1.78	2.4	10.48
Boiler #2	0.564	2.47	0.564	2.47	0.04	0.19	3.78	16.56	0.41	1.78	2.4	10.48
Boiler #3	0.564	2.47	0.564	2.47	0.04	0.19	3.78	16.56	0.41	1.78	2.4	10.48
Cooling Towers	0.75	3.29	0.75	3.29								
Equipment leaks										3.02		
Tank Emissions										1.56		
Grain Handling Fugitives	1.48	6.44	0.33	1.43								

Table 5.3 gives a summary of toxic air pollutants emissions that were estimated to be emitted above the toxic screening emissions levels. All other toxic air pollutants were estimated be below their respective screening emissions levels, the emission inventory is included in Appendix C.

Table 5.3 SUMMARY OF TOXIC AIR POLLUTANTS

Pollutant	Maximum Hourly Emissions – Sum of all emissions units (lb/hr)	Toxic Air Pollutant Screening Emissions Level (lb/hr)	Exceed Screening Emissions Level?
Acetaldehyde	1.26	3.0E-3	Yes
Arsenic	4.56E-5	1.5E-6	Yes
Acrolein	0.105	0.017	Yes
Benzene	0.031	8.0E-4	Yes
Cadmium	2.51E-4	3.7E-6	Yes
Formaldehyde	2.96E-2	5.1E-4	Yes
Nickel	4.79E-4	2.7E-5	Yes
Total PAH (POM)	2.6E-6	2.0E-6	Yes

DEQ reviewed the applicant's calculation methodologies in the January 11, 2007 application update and found them to be acceptable. Following is a summary of the emission estimation methodologies:

- Particulate matter emissions from grain handling, storage and milling are controlled by either a baghouse or a spot filter, emissions estimates are based on manufacturer guarantees.
- Volatile organic compound (VOC), toxic air pollutant (TAP) and hazardous air pollutant (HAP) emissions from fermentation and distillation processes were estimated using source test data from a similar facility. The source test data submitted for the RTO from a similar facility includes PM emissions data from that facilities regenerative thermal oxidizer (RTO) that are not representative of the Pacific Ethanol facility and my overestimate emissions. The source tested had dryer vented to the RTO and Pacific Ethanol does not have a dryer. Emission estimate methodologies are acceptable for permitting purposes, however a emissions test is required for formaldehyde, acetaldehyde and VOC to assure the source does not emission above permitted limits.
- VOC, TAP and HAP emissions from storage tanks and storage tank loadout were made using EPA's TANKS 4.0 emission estimation program and EPA AP-42 emission factors.
- Emissions from the boilers were estimated using EPA AP-42 emission factors.
- Fugitive emissions estimates were made using EPA AP-42 emission factors.

Detailed calculations may be seen in the application materials dated January 11, 2007 which replaced the original calculations.

5.3 Modeling

A detailed modeling analysis is included in Appendix B. All predicted ambient concentrations are less than or equal to 75% of acceptable standards.

Benzene emissions from each boiler were modeled at 2.94E-5 pounds per hour, estimated emissions are actually 8.3E-7 pounds per hour therefore the model was conservative in that a greater emission rate was modeled to show compliance.

5.4 Regulatory Review

This section describes the regulatory analysis of the applicable air quality rules with respect to this PTC.

IDAPA 58.01.01.201.....Permit to Construct Required

The facility's proposed project does not meet the permit to construct exemption criteria contained in Sections 220 through 223 of the Rules. Therefore, a PTC is required.

IDAPA 58.01.01.203.....Permit Requirements for New and Modified Stationary Sources

The applicant has shown to the satisfaction of DEQ that the facility will comply with all applicable emissions standards.

IDAPA 58.01.01.210.....Demonstration of Preconstruction Compliance with Toxic Standards

The preconstruction compliance for all TAPs identified in the permit application is demonstrated. Emissions of seven carcinogenic and one noncarcinogenic toxic air pollutants were emitted above the screening emissions level (see Table 5.3). Emissions of those toxic air pollutants that exceeded the screening emission level were modeled and compared to the acceptable ambient concentration increments listed in Section 586 & 586 of the Rules for the Control of Air Pollution in Idaho. All of these pollutants emissions were modeled and ambient impacts found to be below the Acceptable Ambient Concentration for Carcinogens. Modeling results are documented in the modeling analysis which is included in Appendix C.

IDAPA 58.01.01.224.....Permit to Construct Application Fee

The applicant satisfied the PTC application fee requirement by submitting a fee of $1,000.00 at the time the original application was submitted.

IDAPA 58.01.01.225.....Permit to Construct Processing Fee

The total emissions from the proposed new minor facility are greater than 100 tons per year; therefore, the associated processing fee is $7,500.00. No permit to construct can be issued without first paying the required processing fee.

40 CFR Subpart Dc……..Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

The applicant specified that 3 natural gas fired boilers would be installed and operated. The applicant stated that the manufacturer of the boilers is yet to be determined, since the manufacturer of the boilers has not been determined the applicability of 40 CFR Subpart Dc can not be determined with accuracy. However, since the facility is a new facility is it presumed that this Subpart Dc will be applicable in its entirety (i.e. the 75.6 mmBtu/hr boilers will have been fabricated or modified after June 9, 1989, and after the February 28, 2005 the applicability date for standards and testing requirements for particulate matter). Permit Condition 4.4 requires the facility to maintain records sufficient to determine the applicability of the Subpart.

40 CFR Subpart VV……Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry

The provisions of this Subpart apply to this facility since it will be constructed after the January 5, 1981 applicability date and will produce more than 1,102 tons of ethanol. This Subpart regulates leaks from equipment (pumps, values, seals, etc.) used in the production of ethanol. These requirements are summarized Section 6 of the permit.

40 CFR Supart Subpart Kb…… Standards of Performance for Volatile Organic Liquid Storage Vessels

The provisions of this subpart apply to this facility since it will be constructed after July 23, 1984 and since it will have storage vessels over 75 cubic meters used to store volatile organic liquids. These requirements are include in Permit Condition 5.

5.5 Permit Conditions Review

Permit Condition 2.4

Permit condition requires the facility to maintain on-site manufacturer warranties on the particulate matter grain loading emissions rate from the baghouse and spot filters that control emissions from the corn receiving, milling and storage operations. The application stated that the manufacture of the baghouses is yet to be determined. Emission estimates were made assuming emissions from the baghouse do not exceed 0.005 grains per dry standard cubic foot and that emissions from the spot filters do not exceed 0.01 grains per dry standard cubic foot.

Permit Condition 2.5

Permit Condition 2.5 requires that the permittee develop an O&M manual that shall describe the procedures that will be followed to comply with General Provision 2 and the manufacturer warranty specifications for the baghouses and Spot filters. The manual shall contain, at a minimum, requirements for quarterly inspections of the baghouses and Spot filters. The inspections shall include, but not be limited to, checking the bags or cartridges for structural integrity and that they are appropriately secured in place.

Baghouses and filters are expected to be highly effective in controlling particulate matter emissions from corn handling and milling provided they are operated and maintained according to manufacturer specifications and are periodically inspected.

Permit Condition 2.6

Permit condition 2.6 requires maintaining records of the quarterly inspections of baghouses and filters.

The remaining permit condition of Section 2 are self explanatory and are not described in further detail in this Statement of Basis.

Permit Condition 3.2

Permit Condition 3.2 limits formaldehyde, acetaldehyde and VOC emissions from the RTO consistent with the emission rate limits requested in the application. The applicant provided emission data from a similar, though not identical, RTO that combusts VOC emissions from an existing ethanol plant. An emission test is required to confirm what the actual formaldehyde, acetaldehyde and VOC emissions rates are. Formaldehyde and acetaldehyde emissions from the RTO caused the highest predicted ambient impact relative to there respective acceptable ambient concentrations and is why a source test is required for them. Estimated emissions of acetaldehyde result in a predicted ambient concentration that is 75% of the acceptable ambient concentration, and estimated formaldehyde emissions result in a predicted ambient concentration that is 41% of the acceptable ambient concentration.

Permit Condition 3.3

Permit Condition 3.3 limits the amount of undenatured and denatured ethanol that may be produced. This inherently limits the amount of corn that is handled, the amount of denaturant that is used and ultimately the emissions from the facility.

Permit Condition 3.4

Permit Condition 3.4 requires that all gases that are generated during fermentation and distiallation process are captured and vented through one of two scrubbers and then the RTO. This is assures that the facility operates consistent with the emission estimates provided in the application.

Permit Condition 3.5

Permit Condition 3.5 requires that:

- Denatured ethanol loadout to either railcar or truck shall be by submerged loading.
- All vapors displaced during either railcar or truck loading shall be vented to the RTO.

These requirements are to assure that actual operations are consistent with methods used to estimate emissions.

Permit Condition 3.6

Permit Condition 3.6 requires that the Fermentation and Vent Gas Scrubber shall:

- Use fresh-water as a scrubbing liquid
- Discharge scrubbing liquid to the slurry tank
- Be equipped with scrubbing water flow-rate monitors

These requirements assure that the scrubbers are operated as specified in the scrubber manufacturer warranty.

Permit Condition 3.7

Permit Condition 3.7 requires that the RTO oxidation temperature shall not be less than 1,500 degrees Fahrenheit consistent with the manufacturer warranty.

Permit to Construct Section 4

Permit to Construct Section 4 contains the New Source Performance Standards (NSPS) requirements for steam generating units. Natural gas combustion rates are not limited because emissions estimates were determined based on maximum capacity using manufacturer guarantees on emissions and published emissions factors (therefore no restrictions on operations are required).

Permit to Construct Section 5 & 6

Permit to Construct Section 5 and 6 are to include the NSPS standards for volatile organic compound storage tanks and those for regulating emissions from leaks from valves, flanges and pumps (40 CFR 60.480 and 40 CFR 60.112b).

6. PERMIT FEES

Permit to Construct application and processing fees apply to the facility in accordance with IDAPA 58.01.01.224 & 225. The permit to construct application fee is $1,000 and was paid by Pacific Ethanol at the time of the submission of the application. A Permit to Construct processing fee of $7,500 is required to be paid for non-fugitive emissions according to the emission thresholds given in Section 225. Table 6.1 summarizes the emissions inventory and the Permit to Construct processing fee.

Table 6.1 PTC PROCESSING FEE TABLE

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
NO_X	51.0	0	51.0
SO_2	0.6	0	0.6
CO	33.7	0	33.7

PM_{10}	9.3	0	9.3
VOC	28.64	0	28.64
TAPS/HAPS	9.53	0	9.53
Total:	132.8	0	**132.8**
Fee Due	**$ 7,500.00**		

7. PERMIT REVIEW

7.1 Regional Review of Draft Permit

The DEQ Twin Falls Regional Office provided comment on the draft permit on January 25, 2007. Those comments were incorporated into the permit.

7.2 Facility Review of Draft Permit

Pacific Ethanol was issued a facility draft permit for their review on January 26, 2007. On March 12, 2007 DEQ received a written request from Pacific Ethanol that the permit be made available for public comment along with certification of the emission estimates that were provided on January 11, 2007.

7.3 Public Comment

An opportunity for public comment period on the PTC application was provided from December 26, 2006, to January 25, 2007, in accordance with IDAPA 58.01.01.209.01.c. During this time, there was a request for a public comment period on DEQ's proposed action. Therefore prior to final action this permit will be made available for 30 day comment period.

8. RECOMMENDATION

Based on review of application materials, and all applicable state and federal rules and regulations, staff recommends that Pacific Ethanol be issued proposed PTC No. P-060450 and that the permit is made available for a 30 day public comment period.

DP/bf Permit No. P-060449

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Appendix A

AIRS Information

P-060449

AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

Facility Name: **PACIFIC ETHANOL**
Facility Location: **BURLEY**
AIRS Number: **031-00032**

AIR PROGRAM POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	SM80	TITLE V	AREA CLASSIFICATION A-Attainment U-Unclassified N- Nonattainment
SO_2	B							
NO_x	B							
CO	B							
PM_{10}	SM		SM					
PT (Particulate)	SM							
VOC	SM		SM					
THAP (Total HAPs)	SM							
			APPLICABLE SUBPART					
			Dc, VV, Kb					

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAPs only, class "A" is applied to each pollutant which is at or above the 10 T/yr threshold, **or** each pollutant that is below the 10 T/yr threshold, but contributes to a plant total in excess of 25 T/yr of all HAPs.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

Appendix B

Modeling Review

P-060449

M E M O R A N D U M

DATE: January 18, 2007

TO: Dan Pitman, Senior Air Quality Engineer, Air Program

FROM: Kevin Schilling, Stationary Source Modeling Coordinator, Air Program

PROJECT NUMBER: P- 060450

SUBJECT: Modeling Review for the Pacific Ethanol Burley, LLC Permit to Construct Application for a ethanol production facility in Burley, Idaho

1.0 Summary

Pacific Ethanol Burley, LLC (Pacific Ethanol), submitted a Permit to Construct (PTC) application for an ethanol production facility in Burley, Idaho. Air quality analyses involving atmospheric dispersion modeling of emissions associated operations of the plant were submitted to demonstrate that the modification would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02). Natural Resource Group, Inc. (NRG), Pacific Ethanol's consultant, conducted the ambient air quality analyses.

A technical review of the submitted air quality analyses was conducted by DEQ. The submitted modeling analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that predicted pollutant concentrations from emissions associated with the proposed facility were below significant contribution levels (SCLs); or b) that predicted pollutant concentrations from emissions associated with the facility, when appropriately combined with background concentrations, were below applicable air quality standards at all receptor locations. Table 1 presents key assumptions and results that should be considered in the development of the permit.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
DEQ modeling analysis for acrolein indicated impacts were well below the applicable Acceptable Ambient Concentration (AAC)	Acrolein was not included in the submitted modeling analyses. DEQ revisions in the acrolein emissions rates resulted in those emissions exceeding the screening emissions level (EL), thereby requiring a modeling assessment.
Modeled impacts of criteria pollutants and TAPs are well below applicable standards.	No unique permitting provisions, beyond those assuring actual emissions do not exceed values estimated in the permit application, are necessary to protect ambient air quality standards.

2.0 Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 Area Classification

The Pacific Ethanol facility will be located in Burley, Idaho. This area is designated as an attainment or unclassifiable for all criteria pollutants.

2.1.2 *Significant and Full Impact Analyses*

If estimated maximum pollutant impacts to ambient air from the emissions sources associated with the proposed facility exceed the significant contribution levels (SCLs) of IDAPA 58.01.01.006.90, then a full impact analysis is necessary to demonstrate compliance with IDAPA 58.01.01.203.02. A full impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the National Ambient Air Quality Standards (NAAQS) listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS.

Table 2. APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Contribution Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual	1.0	50[f]	Maximum 1st highest[g]
	24-hour	5.0	150[h]	Maximum 6th highest[i]
Carbon monoxide (CO)	8-hour	500	10,000[j]	Maximum 2nd highest[g]
	1-hour	2,000	40,000[j]	Maximum 2nd highest[g]
Sulfur Dioxide (SO_2)	Annual	1.0	80[f]	Maximum 1st highest[g]
	24-hour	5	365[j]	Maximum 2nd highest[g]
	3-hour	25	1,300[j]	Maximum 2nd highest[g]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[f]	Maximum 1st highest[g]
Lead (Pb)	Quarterly	NA	1.5[h]	Maximum 1st highest[g]

[a]IDAPA 58.01.01.006.90
[b]Micrograms per cubic meter
[c]IDAPA 58.01.01.577 for criteria pollutants
[d]The maximum 1st highest modeled value is always used for significant impact analyses
[e]Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[f]Never expected to be exceeded for any calendar year
[g]Concentration at any modeled receptor
[h]Never expected to be exceeded more than once in any calendar year
[i]Concentration at any modeled receptor when using five years of meteorological data
[j]Not to be exceeded more than once per year

2.1.3 *Toxic Air Pollutant Analyses*

Toxic Air Pollutant (TAP) requirements for PTCs are specified in IDAPA 58.01.01.210. If the emissions increase associated with a new source or modification exceeds screening emission levels (ELs) of IDAPA 58.01.01.585 or 586, then the ambient impact of the emissions increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of IDAPA 58.01.01.585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of IDAPA 58.01.01.586, then compliance with TAP requirements has been demonstrated.

2.2 Background Concentrations

Background concentrations were revised for all areas of Idaho by DEQ in March 2003[1]. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas

1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

with similar population density, meteorology, and emissions sources. Default rural/agricultural background concentrations were used for all criteria pollutants except PM_{10}. PM_{10} background concentrations were based on monitoring data collected from Rupert. Table 3 lists applicable background concentrations.

Table 3. BACKGROUND CONCENTRATIONS		
Pollutant	**Averaging Period**	**Background Concentration ($\mu g/m^3$)[a]**
PM_{10}[b]	24-hour	76
	Annual	27
Carbon monoxide (CO)	1-hour	3,600
	8-hour	2,300
Sulfur dioxide (SO_2)	3-hour	34
	24-hour	26
	Annual	8
Nitrogen dioxide (NO_2)	Annual	17
Lead (Pb)	Quarterly	0.08

a. Micrograms per cubic meter
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

Table 4 lists the modeling parameters used in DEQ's analyses.

Table 4. REFINED MODELING PARAMETERS		
Parameter	**Description/Values**	**Documentation/Addition Description**
Model	ISCST3-PRIME	ISCST3 with the PRIME downwash algorithm, version 04269
Meteorological data	Sept. 2000 – Aug. 2001	Heyburn, Idaho surface data Boise, Idaho upper air data
Terrain	Considered	Receptor, building, and emissions source elevations were determined using Digital Elevation Model (DEM) files
Building downwash	Considered	The building profile input program (BPIP) was used
Receptor Grid	Grid 1	25-meter spacing along the property boundary out to 200 meters
	Grid 2	50-meter spacing out to 500 meters
	Grid 3	100-meter spacing out to 2,000 meters
	Grid 4	250-meter spacing out to 5,000 meters

3.1.1 Modeling protocol and Methodology

The submitted air impact analyses were conducted by NRG. A modeling protocol was submitted to DEQ prior to the application. Modeling was generally conducted using methods and data presented in the protocol and the *State of Idaho Air Quality Modeling Guideline*.

3.1.2 Model Selection

ISCST3 with the PRIME downwash algorithm was used for the modeling analyses. The PRIME downwash algorithm was necessary because of the close proximity of buildings to ambient air receptors. ISCST3, without the PRIME downwash algorithm, does not calculate concentrations within building recirculation cavities. Concentrations within recirculation cavities are handled by ISCST3 with the PRIME downwash algorithm.

3.1.3 Meteorological Data

Surface meteorological data collected from Heyburn, Idaho, between September 2000 and August 2001, combined with upper air data from Boise, Idaho, were used for the modeling analyses. DEQ determined these were the most representative data reasonably available for use in the model.

3.1.4 Terrain Effects

Terrain effects on dispersion were considered in the analyses. Receptor elevations were obtained by NRG using Digital Elevation Model (DEM) 7.5-minute files for Kenyon, Burley, and Burley Southwest.

3.1.5 Facility Layout

The facility layout used in the modeling analyses, including the ambient air boundary, buildings, and emissions units, were checked against the proposed layout provided in the application. The layout used in the model was sufficiently representative of the proposed site layout.

3.1.6 Building Downwash

Downwash effects potentially caused by structures at the facility were accounted for in the dispersion modeling analyses. The Building Profile Input Program (BPIP) was used to calculate direction-specific building dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and emissions release parameters for ISCST3 and ISCST3-PRIME

3.1.7 Ambient Air Boundary

NRG indicated the proposed site will be fenced to prevent unauthorized access. Ambient air was considered as all areas outside of the property boundary fence.

3.1.8 Receptor Network

The receptor grid met the minimum recommendations specified in the *State of Idaho Air Quality Modeling Guideline*. DEQ determined the receptor grid used was adequate to reasonably resolve maximum modeled concentrations.

3.2 Emission Rates

Emissions rates used in the modeling analyses were equal to or somewhat greater than those presented in other sections of the permit application or the DEQ Statement of Basis. Neither the modeling protocol nor the modeling report submitted with the application identified emissions associated with the cooling towers, equipment leaks, tanks, grain handling fugitives, and wet cake fugitives. Review of the submitted modeling input and output files did include these sources, and the stated modeling results reflect the impact of these sources.

3.2.1 Criteria Pollutant Emissions Rates

Table 5 provides criteria pollutant emissions rates used in the modeling analyses for both long-term and short-term averaging periods. Modeling was not performed for SO_2 and CO because these emissions were below DEQ thresholds that identify the need for dispersion modeling analyses.

Table 5. CRITERIA POLLUTANT EMISSIONS RATES USED FOR AIR IMPACT MODELING			
Emissions Point	Description	Emissions Rates[a] (lb/hr)	
		PM_{10}[b]	NOx[e]
SV01	Corn Receiving Baghouse	0.856	0.0
SV02	Corn Handling Baghouse	0.429	0.0
SV03	Corn Bin #1	0.0342	0.0
SV04	Corn Bin #2	0.0342	0.0
SV05	Surge Bin Spot Filters	0.0183	0.0
SV06	Hammermilling Baghouse	0.386	0.0
SV09	Boiler #1	0.564	3.78
SV10	Boiler #2	0.564	3.78
SV11	Boiler #3	0.564	3.78
COOL1	Cooling Tower 1	0.251	0.0
COOL2	Cooling Tower 2	0.251	0.0
COOL3	Cooling Tower 3	0.251	0.0
SV12	RTO	0.0457	0.299
GRAIN1	Grain Handling 1	0.164	0.0
GRAIN2	Grain Handling 2	0.164	0.0

a. Long term rates assume 8760 hours/year of operation
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
c. Sulfur dioxide
d. Carbon monoxide
e. Oxides of nitrogen

3.2.2 TAP Emissions Rates

Table 6 lists applicable TAP emissions associated with the proposed facility that were in excess of the screening emissions level (EL). Acrolein was not included in the modeling analyses submitted to DEQ. Acrolein emissions estimates for the RTO were corrected by DEQ staff, and the revised emissions exceeded the EL. DEQ modeling staff then conducted the acrolein modeling analysis. Emissions of all other TAPs were below applicable ELs and modeling was not required.

Table 6. TAPS EMISSIONS RATES USED FOR AIR IMPACT MODELING									
Emissions Point	Description	Emissions Rates (lb/hr)[a]							
		As[b]	Ben[c]	Cd[d]	Ni[e]	Form[f]	Acetal[g]	Acrol[h]	POM[i]
SV09	Boiler #1	1.48E-5	1.56E-4	8.15E-5	1.56E-4	5.55E-3	0.0	0.0	2.94E-5
SV10	Boiler #2	1.48E-5	1.56E-4	8.15E-5	1.56E-4	5.55E-3	0.0	0.0	2.94E-5
SV11	Boiler #3	1.48E-5	1.56E-4	8.15E-5	1.56E-4	5.55E-3	0.0	0.0	2.94E-5
SV12	RTO	1.18E-6	0.0240	6.46E-6	1.24E-5	1.31E-3	1.26	0.105	0.0
EQUIPFUG	Equipment Leaks	0.0	1.72E-3	0.0	0.0	0.0	0.0	0.0	0.0
TANKS	Tank Emissions	0.0	4.82E-3	0.0	0.0	0.0	0.0	0.0	0.0
WETCAKE	Wet Cake	0.0	0.0	0.0	0.0	1.17E-2	5.85E-3	9.64E-4	0.0

a. Pounds per hour
b. Arsenic
c. Benzene
d. Cadmium
e. Nickel
f. Formaldehyde
g. Acetaldehyde
h. Acrolein
i. Polycyclic Organic Matter

3.3 Emission Release Parameters

Table 7 provides emissions release parameters for the analyses, including stack height, stack diameter, exhaust temperature, and exhaust velocity. The submitted application did not provided documentation on how modeling parameters (release height, area over which emissions are released, and initial dispersion coefficients) for area and volume sources were estimated. DEQ did not require additional information from the applicant since the values used seem reasonable for the specific sources modeled.

Table 7. EMISSIONS AND STACK PARAMETERS

Release Point /Location	Source Type	Stack Height (m)[a]	Modeled Diameter (m)	Stack Gas Temp. (K)[b]	Stack Gas Flow Velocity (m/sec)[c]
SV01	point	19.8	0.45	0.0	30.6
SV02	point	19.8	0.45	0.0	30.6
SV03	point	20.4	0.34	0.0	2.1
SV04	point	20.4	0.34	0.0	2.1
SV05	point	9.14	0.46	0.0	0.6
SV06	point	18.3	0.91	0.0	6.6
SV09	point	13.7	0.91	427.59	11.5
SV10	point	13.7	0.91	427.59	11.5
SV11	point	13.7	0.91	427.59	11.5
COOL1	point	10.36	2.44	294.26	16.1
COOL2	point	10.36	2.44	294.26	16.1
COOL3	point	10.36	2.44	294.26	16.1
SV12	point	13.7	1.52	355.37	4.7
Area Sources					
Release Point /Location	**Source Type**	**Release Height (m)**	**Easterly Length (m)**	**Northerly Length (m)**	**Initial Vertical Dispersion Coefficient σ_{z0} (m)**
EQUIPFUG	Area	0.3	3.1	5	12.2
TANKS	Area	0.6	30.5	30.5	7.6
Volume Sources					
Release Point /Location	**Source Type**	**Release Height (m)**	**Initial Horizontal Dispersion Coefficient σ_{y0} (m)**	**Initial Vertical Dispersion Coefficient σ_{z0} (m)**	
GRAIN1	Volume	2.3	1.7	2.3	
GRAIN2	Volume	2.3	1.7	2.3	
WETCAKE	Volume	0.3	24.4	4.9	

a. Meters
b. Kelvin
c. Meters per second

3.4 Results for Significant and Full Impact Analyses

Results significant impact analyses are shown in Table 8. Full impact analyses were required for PM_{10} and NO_2.

Table 8. SIGNIFICANT IMPACT ANALYSES				
Pollutant	**Averaging Period**	**Maximum Modeled Concentration ($\mu g/m^3$)[a]**	**Significant Impact Level ($\mu g/m^3$)**	**Full Impact Analysis Required**
PM_{10}[b]	24-hour	10.13	5.0	Yes
	Annual	2.06	1.0	Yes
Nitrogen Dioxide (NO_2)	Annual	4.42	1.0	Yes

a. Micrograms per cubic meter
b. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

Table 9 provides a summary of the full impact analyses. NRG conservatively used the maximum 24-hour PM_{10} modeled concentration rather than the maximum 2nd highest modeled concentration (when using only one year of meteorological data) allowed under the regulations. DEQ performed verification modeling analyses for PM_{10} and NO_2. DEQ's results were identical to those submitted in the application.

Table 9. FULL IMPACT ANALYSES						
Pollutant	**Averaging Period**	**Modeled Design Concentration ($\mu g/m^3$)[a]**	**Background Concentration ($\mu g/m^3$)**	**Total Impact ($\mu g/m^3$)**	**NAAQS[b] ($\mu g/m^3$)**	**Percent of NAAQS**
PM_{10}[c]	24-hour	10.13	76	109.7	150	73
	Annual	2.06	27	32.8	50	66
Nitrogen Dioxide (NO_2)	Annual	4.42	17	21.5	100	22

a. Maximum modeled concentration in micrograms per cubic meter
b. National Ambient Air Quality Standards
c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

3.5 Results for TAPs Analyses

Compliance with TAP increments were demonstrated by modeling TAP emissions increases (those TAPs with emissions exceeding the ELs) resulting from operation of the facility. Table 10 summarizes the ambient TAP analyses.

Table 10. RESULTS OF TAP ANALYSES				
TAP	**Averaging Period**	**Maximum Modeled Concentration ($\mu g/m^3$)[a]**	**AAC or AACC[b] ($\mu g/m^3$)**	**Percent of AAC or AACC**
Acetaldehyde	Annual	0.336	4.5E-1	75
Arsenic	Annual	0.00002	2.3E-4	9
Benzene	Annual	0.0526	1.2E-1	44
Cadmium	Annual	0.0001	5.6E-4	18
Formaldehyde	Annual	0.0318	7.7E-2	41
Nickel	Annual	0.00018	4.2E-3	4
POM[d]	Annual	0.00003	3.0E-4	10
Acrolein	24-Hour	0.338	12.5	3

a Micrograms per cubic meter
b Acceptable Ambient Concentration or Acceptable Ambient Concentration for a Carcinogen

4.0 Conclusions

The ambient air impact analyses demonstrated to DEQ's satisfaction that emissions from the facility will not cause or significantly contribute to a violation of any air quality standard.

Appendix C

Emission Inventory (1/11/07)

P-060449

Pacific Ethanol, Inc.

Dan Pitman
Senior Permit Engineer
Idaho Department of Environmental Quality
1410 N. Hilton
Boise, ID 83706

March 12, 2007

RE: Pacific Ethanol Burley, LLC

Dear Dan,

Please find the enclosed emission inventory for the application for a permit to construct for Pacific Ethanol Burley, LLC. This emission inventory was submitted to DEQ on January 11, 2007. Please disregard the additional information submitted by Natural Resource Group on Thursday January 25, 2007 by Natural Resource Group, Inc. A hard copy of this certification, along with a check in the amount of $7,500.00 for the permit application fee, will be sent via Fed-Ex.

Additionally, we have reviewed the draft permit to construct and agree with the terms and conditions. Please feel free to proceed with the public comment notice.
Please let me know if any additional information is required at this time.

Sincerely,

Cheryl A. Pagard

Cheryl Pagard
Director Permitting and Compliance
916.403.2129

916.403.2129
916.717.8499
400 Capitol Mall, Suite 2060
Sacramento, CA 95814
www.pacificethanol.net

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

PERMIT TO CONSTRUCT APPLICATION

Revision 2
02/13/07

Please see instructions on page 2 before filling out the form.

All information is required. If information is missing, the application will not be processed.

IDENTIFICATION	
1. Company Name	Pacific Ethanol Burley, LLC
2. Facility Name (if different than #1)	
3. Facility I.D. No.	
4. Brief Project Description:	
FACILITY INFORMATION	
5. Owned/operated by: (√ if applicable)	☐ Federal government ☐ County government ☐ State government ☐ City government
6. Primary Facility Permit Contact Person/Title	Cheryl Pagard, Director of Permitting and Compliance
7. Telephone Number and Email Address	916.403.2129 cpagard@pacificethanol.net
8. Alternate Facility Contact Person/Title	Tom Koehler, Vice President
9. Telephone Number and Email Address	503.235.8251 tomk@pacificethanol.net
10. Address to which permit should be sent	400 Capitol Mall, Suite 2060
11. City/State/Zip	Sacramento, CA 95814
12. Equipment Location Address (if different than #9)	
13. City/State/Zip	
14. Is the Equipment Portable?	☐ Yes ☒ No
15. SIC Code(s) and NAISC Code	Primary SIC: Secondary SIC (if any): NAICS:
16. Brief Business Description and Principal Product	Ethanol Production Facility, Fuel Alcohol
17. Identify any adjacent or contiguous facility that this company owns and/or operates	N/A
PERMIT APPLICATION TYPE	
18. Specify Reason for Application	☒ New Facility ☐ New Source at Existing Facility ☐ Modify Existing Source: Permit No.:____ Date Issued: ____ ☐ Unpermitted Existing Source: ☐ Required by Enforcement Action: Case No.:____
CERTIFICATION	
IN ACCORDANCE WITH IDAPA 58.01.01.123 (RULES FOR THE CONTROL OF AIR POLLUTION IN IDAHO), I CERTIFY BASED ON INFORMATION AND BELIEF FORMED AFTER REASONABLE INQUIRY, THE STATEMENTS AND INFORMATION IN THE DOCUMENT ARE TRUE, ACCURATE, AND COMPLETE.	
19. Responsible Official's Name/Title	Cheryl Pagard, Director of Permitting and Compliance
20. RESPONSIBLE OFFICIAL SIGNATURE	Cheryl Pagard Date: 3/12/07
21. ☐ Check here to indicate you would like to review a draft permit prior to final issuance.	

Pacific Ethanol Burley, LLC
Limited Potential Emissions @ 60 million gallons ethanol production

Stack/ Vent ID	Control Equipment ID	Emission Unit ID	Emission Sources Associated with Ethanol Operations	Criteria Pollutants (Limited Emissions)						
				PM (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	SO_2 (tpy)	NO_x (tpy)	VOC (tpy)	CO (tpy)
SV01	CE03	EU01	Truck Dump Pit	SV01	SV01	SV01	---	---	---	---
SV01	CE03	EU02	Rail Dump Pit	SV01	SV01	SV01	---	---	---	---
SV01	CE03	SV01	Corn Receiving Baghouse	3.75	3.75	3.75	---	---	---	---
SV02	CE02	EU03	Corn Conveyor #1	SV02	SV02	SV02	---	---	---	---
SV02	CE02	EU04	Corn Elevator #1	SV02	SV02	SV02	---	---	---	---
SV02	CE02	EU05	Corn Conveyor #2	SV02	SV02	SV02	---	---	---	---
SV02	CE02	EU06	Corn Elevator #2	SV02	SV02	SV02	---	---	---	---
SV02	CE02	EU07	Scalper	SV02	SV02	SV02	---	---	---	---
SV02	CE02	EU08	Corn Conveyor #3	SV02	SV02	SV02	---	---	---	---
SV02	CE02	SV02	Corn Handling Baghouse	1.88	1.88	1.88	---	---	---	---
SV03	CE03	EU09	Corn Bin #1	SV03	SV03	SV03	---	---	---	---
SV03	CE03	SV03	Corn Bin #1 Spot Filters	0.15	0.15	0.15	---	---	---	---
SV04	CE04	EU10	Corn Bin #2	SV04	SV04	SV04	---	---	---	---
SV04	CE04	SV04	Corn Bin #2 Spot Filters	0.15	0.15	0.15	---	---	---	---
SV05	CE05	EU11	Surge Bin	SV05	SV05	SV05	---	---	---	---
SV05	CE05	SV05	Surge Bin Spot Filters	0.08	0.08	0.08	---	---	---	---
SV06	CE06	EU12	Hammermill #1	SV06	SV06	SV06	---	---	---	---
SV06	CE06	EU13	Hammermill #2	SV06	SV06	SV06	---	---	---	---
SV06	CE06	EU14	Hammermill #3	SV06	SV06	SV06	---	---	---	---
SV06	CE06	SV06	Hammermilling Baghouse	1.69	1.69	1.69	---	---	---	---
SV12	CE07, CE09	EU16	Liquefaction Tank	---	---	---	---	---	SV12	---
SV12	CE07, CE09	EU17	Yeast Tank	---	---	---	---	---	SV12	---
SV12	CE07, CE09	EU18	Fermenter #1	---	---	---	---	---	SV12	---
SV12	CE07, CE09	EU19	Fermenter #2	---	---	---	---	---	SV12	---
SV12	CE07, CE09	EU20	Fermenter #3	---	---	---	---	---	SV12	---
SV12	CE07, CE09	EU21	Fermenter #4	---	---	---	---	---	SV12	---
SV12	CE07, CE09	EU22	Beerwell	---	---	---	---	---	SV12	---
SV12	CE07, CE09	EU23	De-gas Vessel	---	---	---	---	---	SV12	---
SV12	CE07	SV12	Fermentation Scrubber	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU15	Slurry Tank	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU24	Beer Stripper	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU25	Side Stripper	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU26	Rectifier Column	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU27	Molecular Sieve	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU28	200 Proof Condenser	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU29	Whole Stillage Tank	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU30	Process Condensate Tank	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU31	Evaporator	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU32	Centrifuge #1	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU33	Centrifuge #2	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU34	Syrup Tank	---	---	---	---	---	SV12	---
SV12	CE08, CE09	EU35	Thin Stillage Tank	---	---	---	---	---	SV12	---
SV12	CE08	SV12	Vent Gas Scrubber	---	---	---	---	---	SV12	---
SV12	CE09	EU39	Ethanol Truck Loadout*	---	---	---	---	---	SV12	---
SV12	CE09	EU40	Ethanol Rail Loadout	---	---	---	---	---	SV12	---
SV12	CE09	SV12	Regenerative Thermal Oxidizer**	0.20	0.20	0.20	0.02	1.31	23.27	2.25
SV09	---	EU36	Boiler #1	2.47	2.47	2.47	0.19	16.56	1.78	10.48
SV10	---	EU37	Boiler #2	2.47	2.47	2.47	0.19	16.56	1.78	10.48
SV11	---	EU38	Boiler #3	2.47	2.47	2.47	0.19	16.56	1.78	10.48
---	---	TK01	190 Proof Tank	---	---	---	---	---	0.05	---
---	---	TK02	Denaturant Tank	---	---	---	---	---	0.79	---
---	---	TK03	200 Proof Storage Tank	---	---	---	---	---	0.19	---
---		TK04	200 Proof Storage Tank	---	---	---	---	---	0.19	---
---	---	TK05	Denatured Ethanol	---	---	---	---	---	0.17	---
		TK06	Denatured Ethanol	---	---	---	---	---	0.17	---
---	---	FS01	Truck Traffic	14.55	2.84	0.45	---	---	---	---
---	---	FS02	Fugitive Emissions from Grain Handling	6.44	1.43	1.43	---	---	---	---
---	---	FS03	Fugitive Emissions from Wet Cake Storage Pile / Loadout	---	---	---	---	---	2.67	---
---	---	FS04	Equipment Leaks	---	---	---	---	---	3.02	---
---		FS05	Cooling Towers	3.29	3.29	3.29	---	---	---	---
TOTAL				**33.94**	**17.23**	**14.84**	**0.60**	**50.98**	**35.89**	**33.69**

* Ethanol Loadout is assumed to be 100% truck loadout for most conservative value.

**The RTO controls emissions from the fermentation and distillations scrubbers, as well as ethanol loadout.

Pacific Ethanol Burley, LLC
Hazardous Air Pollutant Summary

Pollutant	Boiler #1 (tpy)	Boiler #2 (tpy)	Boiler #3 (tpy)	RTO* (tpy)	Tanks (tpy)	Wetcake (tpy)	Total (tpy)
2-Methylnaphthalene	7.79E-06	7.79E-06	7.79E-06	6.18E-07	---	---	2.40E-05
3-Methylchloranthrene	5.84E-07	5.84E-07	5.84E-07	4.64E-08	---	---	1.80E-06
7,12-Dimethylbenz(a)anthracen	5.19E-06	5.19E-06	5.19E-06	4.12E-07	---	---	1.60E-05
Acenaphthene	5.84E-07	5.84E-07	5.84E-07	4.64E-08	---	---	1.80E-06
Acenaphthlyene	5.84E-07	5.84E-07	5.84E-07	4.64E-08	---	---	1.80E-06
Acetaldehyde	---	---	---	4.42E+00	---	2.56E-02	4.44E+00
Acrolein	---	---	---	4.59E-01	---	4.22E-03	4.63E-01
Anthracene	7.79E-07	7.79E-07	7.79E-07	6.18E-08	---	---	2.40E-06
Arsenic	6.49E-05	6.49E-05	6.49E-05	5.15E-06	---	---	2.00E-04
Benzo(a)anthracene	5.84E-07	5.84E-07	5.84E-07	4.64E-08	---	---	1.80E-06
Benzene	6.82E-04	6.82E-04	6.82E-04	5.26E-02	2.02E-02	---	7.49E-02
Benzo(a)pyrene	3.90E-07	3.90E-07	3.90E-07	3.09E-08	---	---	1.20E-06
Benzo(b)fluoranthene	5.84E-07	5.84E-07	5.84E-07	4.64E-08	---	---	1.80E-06
Benzo(g,h,i)perylene	3.90E-07	3.90E-07	3.90E-07	3.09E-08	---	---	1.20E-06
Benzo(k)fluoranthene	5.84E-07	5.84E-07	5.84E-07	4.64E-08	---	---	1.80E-06
Beryllium	3.90E-06	3.90E-06	3.90E-06	3.09E-07	---	---	1.20E-05
Cadmium	3.57E-04	3.57E-04	3.57E-04	2.83E-05	---	---	1.10E-03
Carbon Disulfide	---	---	---	1.05E-04	4.05E-04	---	5.10E-04
Chromium	4.54E-04	4.54E-04	4.54E-04	3.61E-05	---	---	1.40E-03
Chrysene	5.84E-07	5.84E-07	5.84E-07	4.64E-08	---	---	1.80E-06
Cobalt	2.73E-05	2.73E-05	2.73E-05	2.16E-06	---	---	8.40E-05
Cumene	---	---	---	2.10E-04	8.09E-05	---	2.91E-04
Dibenzo(a,h)anthracene	3.90E-07	3.90E-07	3.90E-07	3.09E-08	---	---	1.20E-06
Dichlorobenzene	3.90E-04	3.90E-04	3.90E-04	3.09E-05	---	---	1.20E-03
Ethyl benzene	---	---	---	3.15E-02	1.21E-02	---	4.37E-02
Fluoranthene	9.74E-07	9.74E-07	9.74E-07	7.73E-08	---	---	3.00E-06
Fluorene	9.09E-07	9.09E-07	9.09E-07	7.21E-08	---	---	2.80E-06
Formaldehyde	2.43E-02	2.43E-02	2.43E-02	4.82E-03	---	5.12E-02	1.29E-01
Formic Acid	---	---	---	2.12E+00	---	---	2.12E+00
Hexane	5.84E-01	5.84E-01	5.84E-01	7.79E-02	1.21E-02	---	1.84E+00
Indeno(1,2,3-cd)pyrene	5.84E-07	5.84E-07	5.84E-07	4.64E-08	---	---	1.80E-06
Manganese	1.23E-04	1.23E-04	1.23E-04	9.79E-06	---	---	3.80E-04
Mercury	8.44E-05	8.44E-05	8.44E-05	6.70E-06	---	---	2.60E-04
Methanol	---	---	---	6.89E-02	---	3.20E-02	1.01E-01
Naphthalene	1.98E-04	1.98E-04	1.98E-04	1.57E-05	---	---	6.10E-04
Nickel	6.82E-04	6.82E-04	6.82E-04	5.41E-05	---	---	2.10E-03
Phenanathrene	5.52E-06	5.52E-06	5.52E-06	4.38E-07	---	---	1.70E-05
Pyrene	1.62E-06	1.62E-06	1.62E-06	1.29E-07	---	---	5.00E-06
Selenium	7.79E-06	7.79E-06	7.79E-06	6.18E-07	---	---	2.40E-05
Toluene	1.10E-03	1.10E-03	1.10E-03	1.05E-01	4.05E-02	---	1.49E-01
Xylenes	---	---	---	1.05E-01	4.86E-02	---	1.54E-01
Total	**0.61**	**0.61**	**0.61**	**7.44**	**0.13**	**0.11**	**9.53**

*The RTO HAPs include dryer, fermentation, distillation and ethanol loadout HAPs.

Pacific Ethanol Burley, LLC
Grain Hammermilling Emission Calculations

Process Data

Grain Required for 60.00 MMgal EtOH:	22.5	MM bushels/yr =		
Grain Density:	56	lb/bushel		
Total Grain Receiving Throughput:	629,213	tpy =	71.8 ton/hr	143656.05
Wet Cake:			140,289 lb/hr	
Wet Cake Handling (32% solids):	140,289 lb/hr ÷ 2000 lb/ton =		70.1 ton/hr	

Emission Calculation Method

Uncontrolled Potential Emissions = Flow Rate (DSCFM) · Emission Factor (gr/DSCF) ÷ 7,000 gr/lb · 60 min/hr

$PM/PM_{10}/PM_{2.5}$ Emissions from Grain Receiving, Handling, and Hammermilling

Stack ID	Emission Source	Flow Rate (DSCFM)	Emission Factor (gr/DSCF)	Controlled Emissions (lb/hr)	Controlled Emissions (tpy)
SV01	Corn Receiving Baghouse	20,000	0.005	0.86	**3.75**
SV02	Corn Handling Baghouse	10,000	0.005	0.43	**1.88**
SV03	Corn Bin #1 Spot Filters	400	0.01	0.03	**0.15**
SV04	Corn Bin #2 Spot Filters	400	0.01	0.03	**0.15**
SV05	Surge Bin Spot Filters	200	0.01	0.02	**0.08**
SV06	Hammermilling Baghouse	9,000	0.005	0.39	**1.69**

Emission Calculation Method

Uncontrolled Potential Emissions = Throughput (ton/hr) · Emission Factor (lb/ton) · 8,760 hr/yr · 1 ton/2000 lb

Fugitive PM Emissions from Grain Receiving, Handling, and Hammermilling

Stack ID	Emission Source	Throughput (ton/hr)	AP-42* Emission Factor (lb/ton)	Uncontrolled PM Emissions (lb/hr)	Uncontrolled PM Emissions (tpy)	Capture Efficiency	Uncaptured PM Emissions (lb/hr)	Uncaptured PM Emissions (tpy)
FS02	Fugitive Emissions from Grain Handling	420.0	0.035	14.70	64.39	10% uncaptured	1.47	**6.44**

*Emission factors taken from AP-42 Section 9.9.1, 6/98.

Fugitive $PM_{10}/PM_{2.5}$ Emissions from Grain Receiving, Handling, and Hammermilling

Stack ID	Emission Source	Throughput (ton/hr)	AP-42* Emission Factor (lb/ton)	Uncontrolled $PM_{10}/PM_{2.5}$ Emissions (lb/hr)	Uncontrolled $PM_{10}/PM_{2.5}$ Emissions (tpy)	Capture Efficiency	Uncaptured $PM_{10}/PM_{2.5}$ Emissions (lb/hr)	Uncaptured $PM_{10}/PM_{2.5}$ Emissions (tpy)
FS02	Fugitive Emissions from Grain Handling	420.0	0.0078	3.28	14.35	10% uncaptured	0.33	**1.43**

*Emission factors taken from AP-42 Section 9.9.1, 6/98.

Pacific Ethanol Burley, LLC
Fermentation Process

Process Data

VOC and HAP emissions are controlled by the CO_2 scrubber and the RTO

Emissions are estimated based on stack test data at Ace Ethanol in Stanely, WI on Sept. 14-16, 2004.
Emissions are based on Method 18 test data for the plant and scaled linearly based on production capacity.

ACE Ethanol Production Rate at Test = 44.86 MMGal/yr

Potential VOC Emissions

	lb/hr	ton/yr
Tested Emission Rate (as propane):	0.82	3.61
Tested Emission Rate (as VOC)*:	1.35	5.91
Tested Uncontrolled VOC Emission Rate (99.2% Control):	168.73	739.04
Scaled VOC uncontrolled emission rate for Burley:	413.74	1,812.17
Total VOC Control (Scrubber and RTO):	99.0%	
Fermentation Process Controlled Potential Emissions	**4.14**	**18.12**

* Propane to VOC conversion = 0.8234 lb propane/hr ÷ 1.22 (propane to C)· 2 (C to VOC)

Potential HAP Emissions

HAP	Speciated Test Rate (lb/hr)	Scaling Factor for Burley[1]	Controlled Emission Rate (lb/hr)	Controlled Emission Rate (ton/yr)
Acetaldehyde[2]	0.2607	1.34	0.35	2.29
Acrolein[2]	0.0028	1.34	0.004	0.02
Formic Acid	0.3613	1.34	0.48	2.12
Formaldehyde	0.0003	1.34	0.000	0.002
Methanol	0.0109	1.34	0.015	0.06
Total				**4.50**

[1] Scaling factor accounts for the scaling of the production rate of ACE Ethanol at the time of test to the proposed facility production rate as well as a safety factor.

[2] Pollutant ton/yr emissions contain a 50% margin of safety.

Pacific Ethanol Burley, LLC
Distillation Process

Process Data
Emissions controlled by the vent gas scrubber and the RTOs

Emissions are estimated based on stack test data at Ace Ethanol in Stanely, WI on Sept. 14-16, 2004. Emissions are based on Method 18 test data for the plant and scaled linearly based on production capacity.

ACE Ethanol Production Rate at Test = 40.8 MMGal/yr

Potential VOC Emissions

	lb/hr	lb/day	ton/yr
Tested Emission Rate (as propane):	0.12	2.88	0.53
Tested Emission Rate (as VOC)*:	0.20	4.72	0.86
Tested Uncontrolled VOC Emission Rate (99.2% Control):	24.59	590.16	107.70
Scaled VOC uncontrolled emission rate for Wasco:	66.31	1,591.52	290.45
Total VOC Control (Scrubber and RTO):		99.0%	
Distillation Process Controlled Potential Emissions	**0.66**	**15.92**	**2.90**

* Propane to VOC conversion = 0.1200 lb propane/hr ÷ 1.22 (propane to C) · 2 (C to VOC)

Potential HAP Emissions

HAP	Speciated Test Rate (lb/hr)	Scaling Factor for Burley[1]	Controlled Emission Rate (lb/hr)	Controlled Emission Rate (ton/yr)
Acetaldehyde[2]	0.22	1.47	0.32	2.13
Acrolein[2]	0.05	1.47	0.07	0.43
Formaldehyde	0.0002	1.47	0.0002	0.001
Formic Acid	0.0006	1.47	0.0008	0.0037
Methanol	0.0008	1.47	0.0012	0.01
Total				**2.57**

[1] Scaling factor accounts for the scaling of the production rate of ACE Ethanol at the time of test to the proposed facility production rate as well as a safety factor.

[2] Pollutant ton/yr emissions contain a 50% margin of safety.

Pacific Ethanol Burley, LLC
RTO Combustion Calculations

RTO

Max Firing Capacity	6,000,000 BTU/hr
Usable Firing Capacity:	6,000,000 BTU/hr

Primary Fuel Type:	Natural Gas	
Heat Value:	1,020	BTU/cf
Fuel Burning Capacity:	5,882	cf/hr

Pollutant	Emission Factor* (lb/MMBtu)	Emission Rate (lb/hr)	Max. Uncontrolled Emissions (tons/yr)
PM	0.00775	0.047	**0.20**
PM_{10}	0.00775	0.047	**0.20**
Sox	0.00059	0.0035	**0.02**
NO_x**	0.05000	0.300	**1.31**
VOC	0.00561	0.034	**0.15**
CO	0.08568	0.514	**2.25**

*Emission Factors from Fifth Edition AP-42, Section 1.4, "Natural Gas Combustion", 10/96.
**Emission Factor provided by manufacturer

Pacific Ethanol Burley, LLC
RTO HAP Calculations

HAP Emissions

Pollutant	Emission Factor* (lb/MMBtu)	Potential Emissions (lb/hr)	Potential Emissions (tpy)
2-Methylnaphthalene	2.35E-08	1.4E-07	6.2E-07
3-Methylchloranthrene	1.76E-09	1.1E-08	4.6E-08
7,12-Dimethylbenz(a)anthracene	1.57E-08	9.4E-08	4.1E-07
Acenaphthene	1.76E-09	1.1E-08	4.6E-08
Acenaphthlyene	1.76E-09	1.1E-08	4.6E-08
Anthracene	2.35E-09	1.4E-08	6.2E-08
Arsenic	1.96E-07	1.2E-06	5.2E-06
Benzo(a)anthracene	1.76E-09	1.1E-08	4.6E-08
Benzene	2.06E-06	1.2E-05	5.4E-05
Benzo(a)pyrene	1.18E-09	7.1E-09	3.1E-08
Benzo(b)fluoranthene	1.76E-09	1.1E-08	4.6E-08
Benzo(g,h,i)perylene	1.18E-09	7.1E-09	3.1E-08
Benzo(k)fluoranthene	1.76E-09	1.1E-08	4.6E-08
Berylium	1.18E-08	7.1E-08	3.1E-07
Cadmium	1.08E-06	6.5E-06	2.8E-05
Chromium	1.37E-06	8.2E-06	3.6E-05
Chrysene	1.76E-09	1.1E-08	4.6E-08
Cobalt	8.24E-08	4.9E-07	2.2E-06
Dibenzo(a,h)anthracene	1.18E-09	7.1E-09	3.1E-08
Dichlorobenzene	1.18E-06	7.1E-06	3.1E-05
Fluoranthene	2.94E-09	1.8E-08	7.7E-08
Fluorene	2.75E-09	1.6E-08	7.2E-08
Formaldehyde	7.35E-05	4.4E-04	1.9E-03
Hexane	1.76E-03	1.1E-02	4.6E-02
Indeno(1,2,3-cd)pyrene	1.76E-09	1.1E-08	4.6E-08
Manganese	3.73E-07	2.2E-06	9.8E-06
Mercury	2.55E-07	1.5E-06	6.7E-06
Naphthalene	5.98E-07	3.6E-06	1.6E-05
Nickel	2.06E-06	1.2E-05	5.4E-05
Phenanathrene	1.67E-08	1.0E-07	4.4E-07
Pyrene	4.90E-09	2.9E-08	1.3E-07
Selenium	2.35E-08	1.4E-07	6.2E-07
Toluene	3.33E-06	2.0E-05	8.8E-05
Total			**0.05**

*Emission Factor is from AP-42, 5th Edition, Section 1.4, "External Combustion Sources," 7/98

Pacific Ethanol Burley, LLC
Cooling Tower Emissions, FS05

Cooling tower PM emissions are based on an induced draft cooling tower with a circulating water flow rate of 15,000 gallons per minute (gpm) and a conservative drift (0.005% of the circulating water flow). Calculations assume a total dissolved solids concentration of 2,000 ppm.

Circulating Flow Rate (gallons/minute)	Circulating Flow Rate (gallons/hour)	Total Drift (% circulating flow)	Total Drift (gal/hr)	Total Drift (lb/hr)	PM/PM_{10} Emissions (lb/day)	$PM/PM_{10}/PM_{2.5}$ Emissions (lb/yr)	$PM/PM_{10}/PM_{2.5}$ Emissions (tpy)
15,000	900,000	0.005%	45.00	360.00	18.01	**6,575**	**3.29**

Density of Cooling Water =	8.34	lb/gal
TDS =	2,000	ppm

Pacific Ethanol Burley LLC
Combustion Calculations

Boiler #1	***Natural Gas***	
Firing Capacity:	75.6	MMBTU/hr
Heat Value:	1,020	BTU/cf
Fuel Burning Capacity:	0.0741	MMCf/hr
Stack Gas Flow	15,678	dscfm

Pollutant	Emission Factor* (lb/MMBtu)	Emission Rate (lb/hr)	Max. Uncontrolled Emissions (tpy)
PM	7.45E-03	0.56	2.47
$PM_{10}/PM_{2.5}$	7.45E-03	0.56	2.47
SO_2	5.88E-04	0.04	0.19
NO_x**	5.00E-02	3.78	16.56
VOC	5.39E-03	0.41	1.78
CO***	3.23E-05	2.39	10.48

*Emission Factors from Fifth Edition AP-42, Section 1.4, "Natural Gas Combustion", 7/98.
**Based on manufacturer guarantee.
***Based on manufacturer estimated emissions of 50 ppm,v, given in lb/cf.

Pacific Ethanol Burley LLC
Combustion Calculations

Boiler #2	***Natural Gas***	
Firing Capacity:	75.6	MMBTU/hr
Heat Value:	1,020	BTU/cf
Fuel Burning Capacity:	0.0741	MMCf/hr
Stack Gas Flow	15,678	dscfm

Pollutant	Emission Factor* (lb/MMBtu)	Emission Rate (lb/hr)	Max. Uncontrolled Emissions (tpy)
PM	7.45E-03	0.56	2.47
$PM_{10}/PM_{2.5}$	7.45E-03	0.56	2.47
SO_2	5.88E-04	0.04	0.19
NO_x**	5.00E-02	3.78	16.56
VOC	5.39E-03	0.41	1.78
CO***	3.23E-05	2.39	10.48

*Emission Factors from Fifth Edition AP-42, Section 1.4, "Natural Gas Combustion", 7/98.
**Based on manufacturer guarantee.
***Based on manufacturer estimated emissions of 50 ppm,v, given in lb/cf.

Pacific Ethanol Burley LLC
Combustion Calculations

Boiler #3	***Natural Gas***	
Firing Capacity:	75.6	MMBTU/hr
Heat Value:	1,020	BTU/cf
Fuel Burning Capacity:	0.0741	MMCf/hr
Stack Gas Flow	15,678	dscfm

Pollutant	Emission Factor* (lb/MMBtu)	Emission Rate (lb/hr)	Max. Uncontrolled Emissions (tpy)
PM	7.45E-03	0.56	2.47
$PM_{10}/PM_{2.5}$	7.45E-03	0.56	2.47
SO_2	5.88E-04	0.04	0.19
NO_x**	5.00E-02	3.78	16.56
VOC	5.39E-03	0.41	1.78
CO***	3.23E-05	2.39	10.48

*Emission Factors from Fifth Edition AP-42, Section 1.4, "Natural Gas Combustion", 7/98.
** Based on manufacturer guarantee.
***Based on manufacturer estimated emissions of 50 ppm,v, given in lb/cf.

Pacific Ethanol Burley LLC
Combustion Calculations

HAP Calculations

Pollutant	Emission Factor* (lb/MMBtu)	*Boiler #1* Potential Emissions (lb/hr)	*Boiler #1* Potential Emissions (tpy)	*Boiler #2* Potential Emissions (lb/hr)	*Boiler #2* Potential Emissions (tpy)	*Boiler #3* Potential Emissions (lb/hr)	*Boiler #3* Potential Emissions (tpy)
2-Methylnaphthalene	2.35E-08	1.8E-06	7.8E-06	1.8E-06	7.8E-06	1.8E-06	7.8E-06
3-Methylchloranthrene	1.76E-09	1.3E-07	5.8E-07	1.3E-07	5.8E-07	1.3E-07	5.8E-07
7,12-Dimethylbenz(a)anthracene	1.57E-08	1.2E-06	5.2E-06	1.2E-06	5.2E-06	1.2E-06	5.2E-06
Acenaphthene	1.76E-09	1.3E-07	5.8E-07	1.3E-07	5.8E-07	1.3E-07	5.8E-07
Acenaphthlyene	1.76E-09	1.3E-07	5.8E-07	1.3E-07	5.8E-07	1.3E-07	5.8E-07
Anthracene	2.35E-09	1.8E-07	7.8E-07	1.8E-07	7.8E-07	1.8E-07	7.8E-07
Arsenic	1.96E-07	1.5E-05	6.5E-05	1.5E-05	6.5E-05	1.5E-05	6.5E-05
Benzo(a)anthracene	1.76E-09	1.3E-07	5.8E-07	1.3E-07	5.8E-07	1.3E-07	5.8E-07
Benzene	2.06E-06	1.6E-04	6.8E-04	1.6E-04	6.8E-04	1.6E-04	6.8E-04
Benzo(a)pyrene	1.18E-09	8.9E-08	3.9E-07	8.9E-08	3.9E-07	8.9E-08	3.9E-07
Benzo(b)fluoranthene	1.76E-09	1.3E-07	5.8E-07	1.3E-07	5.8E-07	1.3E-07	5.8E-07
Benzo(g,h,i)perylene	1.18E-09	8.9E-08	3.9E-07	8.9E-08	3.9E-07	8.9E-08	3.9E-07
Benzo(k)fluoranthene	1.76E-09	1.3E-07	5.8E-07	1.3E-07	5.8E-07	1.3E-07	5.8E-07
Berylium	1.18E-08	8.9E-07	3.9E-06	8.9E-07	3.9E-06	8.9E-07	3.9E-06
Cadmium	1.08E-06	8.2E-05	3.6E-04	8.2E-05	3.6E-04	8.2E-05	3.6E-04
Chromium	1.37E-06	1.0E-04	4.5E-04	1.0E-04	4.5E-04	1.0E-04	4.5E-04
Chrysene	1.76E-09	1.3E-07	5.8E-07	1.3E-07	5.8E-07	1.3E-07	5.8E-07
Cobalt	8.24E-08	6.2E-06	2.7E-05	6.2E-06	2.7E-05	6.2E-06	2.7E-05
Dibenzo(a,h)anthracene	1.18E-09	8.9E-08	3.9E-07	8.9E-08	3.9E-07	8.9E-08	3.9E-07
Dichlorobenzene	1.18E-06	8.9E-05	3.9E-04	8.9E-05	3.9E-04	8.9E-05	3.9E-04
Fluoranthene	2.94E-09	2.2E-07	9.7E-07	2.2E-07	9.7E-07	2.2E-07	9.7E-07
Fluorene	2.75E-09	2.1E-07	9.1E-07	2.1E-07	9.1E-07	2.1E-07	9.1E-07
Formaldehyde	7.35E-05	5.6E-03	2.4E-02	5.6E-03	2.4E-02	5.6E-03	2.4E-02
Hexane	1.76E-03	1.3E-01	5.8E-01	1.3E-01	5.8E-01	1.3E-01	5.8E-01
Indeno(1,2,3-cd)pyrene	1.76E-09	1.3E-07	5.8E-07	1.3E-07	5.8E-07	1.3E-07	5.8E-07
Manganese	3.73E-07	2.8E-05	1.2E-04	2.8E-05	1.2E-04	2.8E-05	1.2E-04
Mercury	2.55E-07	1.9E-05	8.4E-05	1.9E-05	8.4E-05	1.9E-05	8.4E-05
Naphthalene	5.98E-07	4.5E-05	2.0E-04	4.5E-05	2.0E-04	4.5E-05	2.0E-04
Nickel	2.06E-06	1.6E-04	6.8E-04	1.6E-04	6.8E-04	1.6E-04	6.8E-04
Phenanathrene	1.67E-08	1.3E-06	5.5E-06	1.3E-06	5.5E-06	1.3E-06	5.5E-06
Pyrene	4.90E-09	3.7E-07	1.6E-06	3.7E-07	1.6E-06	3.7E-07	1.6E-06
Selenium	2.35E-08	1.8E-06	7.8E-06	1.8E-06	7.8E-06	1.8E-06	7.8E-06
Toluene	3.33E-06	2.5E-04	1.1E-03	2.5E-04	1.1E-03	2.5E-04	1.1E-03
Total		0.14	**0.61**	0.14	**0.61**	0.14	**0.61**

*Emission Factors from AP-42, 5th Edition, Section 1.4, "External Combustion Sources," 7/98

Pacific Ethanol Burley, LLC
Fugitive Dust Emissions from Truck Traffic, FS01

E= [k * (sL/2)^0.65 * (W/3)^1.5 - C](1-(P/4N)) AP-42, Section 13.2.2-1

Factor	Description	Source	PM Value	PM_{10} Value	$PM_{2.5}$ Value
E =	Emission factor (lb/VMT)	Calculation, above	1.06	0.21	0.03
k =	PM Particle size multiplier (lb/VMT)	AP-42, Section 13.2.1	0.082	0.016	0.0024
sL =	Road surface silt loading (g/m^2)	AP-42, Section 13.2.1-2	0.60	0.60	0.60
C =	Vehicle exhaust emission factor		0.0005	0.0005	0.0004
P =	Number of "wet" days in an averaging period		90	90	90
N =	Number of days in an averaging period		365	365	365
W =	Mean vehicle weight (ton)		29.00	29.00	29.0

PM Emissions from Paved Roads

Activity	Quantity Transported per truck	No. of Trucks (truck/yr)	Miles Traveled per Truck (miles/truck)	Annual Mileage (VMT/yr)	Uncontrolled PM Emissions (lb/yr)	Uncontrolled PM Emissions (tpy)
Grain receiving	25 ton	25,169	0.50	12,584	13,306	6.65
Wet Cake haul out	25 ton	24,579	0.50	12,289	12,994	6.50
Ethanol haul out	8,000 gal	7,875	0.32	2,520	2,665	1.33
Denaturant delivery	8,000 gal	375	0.32	120	127	0.06
Total						**14.55**

PM_{10} Emissions from Paved Roads

Activity	Quantity Transported per truck	No. of Trucks (truck/yr)	Miles Traveled per Truck (miles/truck)	Annual Mileage (VMT/yr)	Uncontrolled PM_{10} Emissions (lb/yr)	Uncontrolled PM_{10} Emissions (tpy)
Grain receiving	25 ton	25,169	0.50	12,584	2,596	1.30
Wet Cake haul out	25 ton	24,579	0.50	12,289	2,535	1.27
Ethanol haul out	8,000 gal	7,875	0.32	2,520	520	0.26
Denaturant delivery	8,000 gal	375	0.32	120	25	0.01
Total						**2.84**

PM_{10} Emissions from Paved Roads

Activity	Quantity Transported per truck	No. of Trucks (truck/yr)	Miles Traveled per Truck (miles/truck)	Annual Mileage (VMT/yr)	Uncontrolled PM_{10} Emissions (lb/yr)	Uncontrolled PM_{10} Emissions (tpy)
Grain receiving	25 ton	25,169	0.50	12,584	389	0.19
Wet Cake haul out	25 ton	24,579	0.50	12,289	380	0.19
Ethanol haul out	8,000 gal	7,875	0.50	3,938	122	0.06
Denaturant delivery	8,000 gal	375	0.50	188	6	0.00
Total						**0.45**

Pacific Ethanol Burley, LLC
Equipment Leak VOC Emissions, FS04

Process Stream	Equipment Component Source	Product	Component Count*	Emission Factor *** (lb/comp.-hr)	Uncontrolled Rate**** (lb/hr)	LDAR Control Effectiveness	Controlled Rate (lb/hr)	TOC weight** (%)	VOC Emissions (lb/hr)	VOC Emissions (tpy)
Fermentation	Valves	Gas/Vapor	0.0	0.01316	0.00	87%	0.00	13.00%	0.00	0.00
	Valves	Light Liquid	90.0	0.00888	0.80	84%	0.13	13.00%	0.02	0.07
	Pumps	Light Liquid	6.0	0.04387	0.26	69%	0.08	13.00%	0.01	0.05
	Compressor Seals	Gas/Vapor	0.0	0.50265	0.00	75%	0.00	13.00%	0.00	0.00
	Pressure-Relief Valves	Gas/Vapor	5.0	0.22928	1.15	95%	0.06	13.00%	0.01	0.03
	Sampling Connections	All	0.0	0.03307	0.00	87%	0.00	13.00%	0.00	0.00
	Open-ended Lines	All	5.0	0.00376	0.02	84%	0.00	13.00%	0.00	0.00
	Flanges (connectors)	All	166.0	0.00403	0.67	84%	0.11	13.00%	0.01	0.06
Distillation	Valves	Gas/Vapor	45.0	0.01316	0.59	87%	0.08	81.70%	0.06	0.28
	Valves	Light Liquid	22.0	0.00888	0.20	84%	0.03	87.10%	0.03	0.12
	Pumps	Light Liquid	7.0	0.04387	0.31	69%	0.10	81.70%	0.08	0.34
	Compressor Seals	Gas/Vapor	0.0	0.50265	0.00	75%	0.00	81.70%	0.00	0.00
	Pressure-Relief Valves	Gas/Vapor	7.0	0.22928	1.60	95%	0.08	81.70%	0.07	0.29
	Sampling Connections	All	0.0	0.03307	0.00	87%	0.00	81.70%	0.00	0.00
	Open-ended Lines	All	15.0	0.00376	0.06	84%	0.01	81.70%	0.01	0.03
	Flanges (connectors)	All	190.0	0.00403	0.77	84%	0.12	81.70%	0.10	0.44
Tank Farm	Valves	Gas/Vapor	0.0	0.01316	0.00	87%	0.00	100.00%	0.00	0.00
	Valves	Light Liquid	70.0	0.00888	0.62	84%	0.10	100.00%	0.10	0.44
	Pumps	Light Liquid	5.0	0.04387	0.22	69%	0.07	100.00%	0.07	0.30
	Compressor Seals	Gas/Vapor	0.0	0.50265	0.00	75%	0.00	100.00%	0.00	0.00
	Pressure-Relief Valves	Gas/Vapor	5.0	0.22928	1.15	95%	0.06	100.00%	0.06	0.25
	Sampling Connections	All	0.0	0.03307	0.00	87%	0.00	100.00%	0.00	0.00
	Open-ended Lines	All	6.0	0.00376	0.02	84%	0.00	100.00%	0.00	0.02
	Flanges (connectors)	All	110.0	0.00403	0.44	84%	0.07	100.00%	0.07	0.31
Total			**754.0**		**8.87**		**1.09**		**0.69**	**3.02**

*Component counts are based on Subpart VV equipment inventory from Delta T.
**TOC is considered to be worst case for each process stream identified.
***Emission factors taken from Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017. Table 2-1 and Table 5-2.
****Emission rate is taken from Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017, and based on the Leak Detection and Repair Program.

Pacific Ethanol Burley, LLC
Ethanol Loading Rack Emissions

From Fifth Edition AP-42, Section 5.2:

$$L = 12.46 \cdot S \cdot P \cdot M \div T$$

where:
L = Loading Loss, lb VOC/1000 gal of liquid loaded
S = Saturation Factor (AP-42 Table 5.2-1)
P = True Vapor Pressure of Liquid Loaded, psia
M = Molecular Weight of Vapors, lb/lb-mole
T = Temperature of Bulk Liquid Loaded, R

The values of P, T, and M are taken from the TANKS software which calculates the annual average bulk product temperature based on the annual average temperatures for the city of Pocatello, ID. The PTE is based on loading the maximum volume of ethanol that can be distilled by the facility plus denaturant at a concentration of 5 % by volume.

The submerged loading rack for truck loadout employs an air pollution control device (RTO) with a VOC destruction efficiency of 98.0%. As shown, it is conservative to assume all trucks previously carried gasoline and will be controlled using the attached control device.

Product	Annual Throughput (1000 gal)	Saturation Factor S	Vapor Molecular Weight MW	Product Temperature T (deg R)	True Vapor Pressure P (psia)	Loading Loss (lb/1000 gal)	Uncontrolled Loss (lb/hr)	Uncontrolled Loss (tpy)	Controlled Loss 99% (lb/hr)	Controlled Loss 99% (tpy)
Rail Loadout										
Denatured Ethanol	63,000	0.6	50.0049	506.04	0.5284	0.3904	2.81	12.30	0.03	**0.12**
Truck Loadout										
Gasoline	63,000	1	66.0000	506.04	4.1037	6.6689	47.96	210.07	0.48	**2.10**
									Total* =	**2.10**

* Loadout is assumed to be 100% truck loadout for most conservative value.

Pacific Ethanol Burley, LLC
Storage Tanks

Undenatured EtOH	60,000,000	gal/yr
Denaturant	3,000,000	gal/yr
Denatured EtOH	63,000,000	gal/yr
190 Proof	600,000	gal/yr

Tank	Contents	Throughput		Capacity	
TK01	100 Proof (1% of 60,000,000)	600,000	gal/yr	116,800	gallons
TK02	Denaturant	3,000,000	gal/yr	74,300	gallons
TK03	200 Proof Tank (50% of 60,000,000	30,000,000	gal/yr	116,800	gallons
TK04	200 Proof Tank (50% of 60,000,000	30,000,000	gal/yr	116,800	gallons
TK05	Denatured EtOH (50% of 63,000,00	31,500,000	gal/yr	500,000	gallons
TK06	Denatured EtOH (50% of 63,000,00	31,500,000	gal/yr	500,000	gallons

	TOTAL Ethanol Emissions (lb/yr) from Tanks 4.09	TOTAL gasoline emissions (lb/yr)	Gasoline (speciated) Cyclohexane 0.5% (lb/year)	Gasoline (speciated) Benzene 2.5% (lb/year)	Gasoline (speciated) Hexane 1.5% (lb/year)	Gasoline (speciated) Pentane 50% (lb/year)	Gasoline (speciated) NeoHexane 31.5% (lb/year)	Gasoline (speciated) Toluene 5% (lb/year)	Gasoline (speciated) Xylene 5% (lb/year)	Gasoline (speciated) Ethyl Benzene 1.5% (lb/year)	Gasoline (speciated) 1,2,4-Trimethyl benzene 2.5% (lb/year)	Carbon Disulfide 0.005% (lb/year)	Cumene 0.01% (lb/year)
Loadout		4201.39	21.01	105.03	63.02	2100.70	1323.44	210.07	210.07	63.02	105.03	0.21	0.42
TK01	108.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TK02	0.00	1584.81	7.92	39.62	23.77	792.41	499.22	79.24	79.24	23.77	39.62	0.08	0.16
TK03	380.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TK04	380.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TK05	288.89	51.63	0.26	1.29	0.77	25.82	16.26	2.58	2.58	0.77	1.29	0.00	0.01
TK06	288.89	51.63	0.26	1.29	0.77	25.82	16.26	2.58	2.58	0.77	1.29	0.00	0.01
TOTALS (lb/year)	1448.01	1688.07	8.44	42.20	25.32	844.04	531.74	84.40	84.40	25.32	42.20	0.08	0.17
TOTALS (ton/year)	**0.72**	**0.84**	**0.00**	**0.02**	**0.01**	**0.42**	**0.27**	**0.04**	**0.04**	**0.01**	**0.02**	**0.00**	**0.00**
TOTALS (lb/hr)	0.17	0.19	0.00	0.00	0.00	0.10	0.06	0.01	0.01	0.00	0.00	0.00	0.00

HAP Emissions from Storage Tanks

Pollutant	Emissions Source						
Storage Tanks	**TK001**	**TK002**	**TK003**	**TK004**	**TK005**	**TK006**	
VOC (lbs/yr)	108.57	1584.81	380.83	380.83	340.52	340.52	
VOC (tons/yr)	0.05	0.79	0.19	0.19	0.17	0.17	
HAP Fractions							
Benzene		2.50E-02			2.50E-02	2.50E-02	
Carbon Disulfide		5.00E-04			5.00E-04	5.00E-04	
Cumene		1.00E-04			1.00E-04	1.00E-04	
Ethylbenzene		1.50E-02			1.50E-02	1.50E-02	
n-Hexane		1.50E-02			1.50E-02	1.50E-02	
Toluene		5.00E-02			5.00E-02	5.00E-02	
Xylenes		5.00E-02			5.00E-02	5.00E-02	
HAP Emissions (tpy)							**Total**
Benzene		1.98E-02			2.13E-04	2.13E-04	2.02E-02
Carbon Disulfide		3.96E-04			4.26E-06	4.26E-06	4.05E-04
Cumene		7.92E-05			8.51E-07	8.51E-07	8.09E-05
Ethylbenzene		1.19E-02			1.28E-04	1.28E-04	1.21E-02
n-Hexane		1.19E-02			1.28E-04	1.28E-04	1.21E-02
Toluene		3.96E-02			4.26E-04	4.26E-04	4.05E-02
Xylenes		3.96E-02			8.51E-03	4.26E-04	4.86E-02
Total	**0.00E+00**	**1.23E-01**	**0.00E+00**		**9.41E-03**	**1.32E-03**	**1.34E-01**

Pacific Ethanol Burley, LLC
Wetcake Storage Emissions, FS05

Wetcake emissions based on November 2, 2004 test data from a wetcake storage building at DENCO, LLC in Morris, MN.

Normal Operating Scenario

Production Rates:

18 tons/hr wetcake (wet basis) production @ DENCO

70.1 tons/hr wetcake (wet basis) production @ Pacific Ethanol Burley LLC (Max)

DENCO Test Results* -> Emission Factor -> Burley Estimated Emissions

Detection?**	Pollutant	DENCO lb/hr @ 18 ton/hr production rate	Emission Factor (lb/ton wetcake)	Potential Estimated Emissions (lb/hr)	Potential Estimated Emissions (tpy)***
non-detect	Acetaldehyde	0.001	5.56E-05	5.85E-03	2.56E-02
non-detect	Acrolein	0.00017	9.17E-06	9.64E-04	4.22E-03
	Acetic Acid	0.08	4.44E-03	4.68E-01	2.05E+00
	Ethanol	0.02	1.11E-03	1.17E-01	5.12E-01
non-detect	Formaldehyde	0.002	1.11E-04	1.17E-02	5.12E-02
non-detect	Formic Acid	---	---	---	---
non-detect	2-furaldehyde	---	---	---	---
non-detect	Methanol	0.00125	6.94E-05	7.31E-03	3.20E-02
VOC Total				0.610	**2.67**
HAPs Total				0.026	**0.11**

*Emission estimates based on November 2, 2004 emission testing at wetcake storage building at

**1/2 the detection limit used as emission estimate for non-detect results.

***The VOC total emissions have been increased by 50% to be conservative.

Production Throughputs for Pacific Ethanol Burley, LLC

Undenatured ethanol throughput:	60	MMgal/yr	(proposed limit)
Denaturant throughput:	3.000	MMgal/yr	(assuming 5% by volume of ethanol produced which is 4% by weight)
Denatured ethanol (fuel) throughput:	63.00	MMgal/yr	(denatured ethanol)

Corn Processed:	22.5	MMBu/yr
	629213	tpy
	71.8	ton/hr

Assuming 2.67 gal EtOH per bushel of corn and 56 lb/Bu

Maximum Wetcake Produced		
	196629	tpy DDGS
	22.4	ton/hr DDGS
	70.1	ton/hr Wetcake

Assuming 17.5 lb DDGS per bushel of corn and wetcake contains 32% DDGS solids